

AMENDMENT
U.S. APPLICATION NO. 09/619,560

REMARKS

In order to conform with the evidence of unexpected results provided in the present application, claims 1, 10 and 19 have been amended to limit the claims to processes utilizing transalkylation catalysts which comprise (i) a first crystalline molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom; and (ii) a second crystalline molecular sieve different from the first molecular sieve and selected from zeolite beta, zeolite Y and mordenite. Moreover, claims 2 and 15 were amended to limit the subject matter to the second crystalline molecular sieves, zeolite beta and mordenite for which specific data showing unexpected results is provided. Applicants respectfully request entry of this Amendment and reconsideration of this application, as amended.

Rejection Under 35 USC 103(a)

Claims 1-19 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaufman (U.S. Patent No. 3,385,906) in view of Cheng et al (U.S. Patent No. 5,557,024). In particular, the Examiner argues that Kaufman discloses the production of cumene by the liquid phase transalkylation of diisopropylbenzene with benzene in the presence of zeolite Y. Although acknowledging that Kaufman fails to disclose the mixture of transalkylation catalysts claimed in the present application, the Examiner relies on the Cheng reference for its disclosure of the use of MCM-22, MCM-49, zeolite Y, zeolite beta and mordenite, including TEA-mordenite, as transalkylation catalysts. According to the Examiner, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the process of Kaufman by utilizing a combination of any two of the transalkylation catalysts disclosed by Cheng because each of these is individually used as transalkylation catalysts. The Examiner has maintained his rejection despite applicants' arguments that they have rebutted any showing of *prima facie* obviousness with

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evidence of superior results. Examiner maintains the position that the relied upon results "are not of a superior nature."

This rejection is respectfully traversed and reconsideration is requested.

Applicants respectfully submit that the experimental data provided in the specification show superior results obtained from a process which employs a mixture of a first crystalline molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom; and (ii) a second crystalline molecular sieve different from the first molecular sieve and selected from zeolite beta, zeolite Y and mordenite. It is unexpected that (a) a mixture of MCM-22 and mordenite would exhibit an advantageous combination of high diisopropylbenzene conversion activity, high cumene selectivity and low ethylbenzene and n-propylbenzene selectivity as compared with each of the catalysts on its own; and (b) a mixture of MCM-22 and beta would exhibit an advantageous combination of high diisopropylbenzene conversion activity, high cumene selectivity and low ethylbenzene, 2,2 diphenylpropane and n-propylbenzene selectivity as compared with each of the catalysts on its own.

The Examiner himself has acknowledged (at page 5, lines 17 and 18 of the November 28, 2001 office action) that an advantage has been shown in terms of the present invention's propylbenzene selectivity--1056 ppm with MCM-22, 870 ppm with mordenite and 777 ppm with combined MCM-22/mordenite. This is clearly surprising and unexpected because one skilled in the art would intuitively expect intermediate n-propylbenzene selectivity, i.e., between 1056 ppm and 870 ppm, rather than the highly desirable and significantly lower amount of 777 ppm n-propylbenzene selectivity. Similarly, the Examiner specifically points out an unexpected advantage for the present invention's mixture of MCM-22 and zeolite beta, i.e., "50.3% using MCM-22, 49.5% with zeolite beta and 52.4% combined" (id. at page 6, line 1) in terms of diisopropylbenzene conversion activity, and "1056 ppm with MCM-22, 766 ppm with zeolite beta, and 644 ppm combined" in terms of n-propylbenzene selectivity

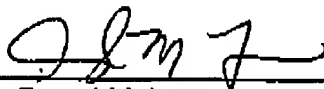
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(id. at page 6, lines 4 and 5). Again such improvements are wholly unexpected given that one skilled in the art would expect the blends of molecular sieves to provide results intermediate the boundaries set out by each individual molecular sieve. The results otherwise, clearly represent a surprising result which is significant given the economic advantages derivable from even slight improvements in these selectivities. The Examiner's failure to accord these improved results sufficient moment to overcome the instant prima facie obviousness rejection, is inappropriate. Accordingly, it is respectfully urged that the Examiner withdraw this rejection in view of the surprising results of the presently claimed subject matter and the newly reduced scope of the present claims to more closely conform with the data presented in support of patentability. Allowance of the present claims is therefore respectfully requested.

In view of the foregoing comments, entry of this Amendment and allowance of this application is earnestly solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The following changes are being made to claims 1, 2, 10, 15 and 19:

1. (Amended) A process for producing a monoalkylated aromatic compound comprising the step of contacting a polyalkylated aromatic compound with an alkylatable aromatic compound under at least partial liquid phase conditions and in the presence of a transalkylation catalyst to produce a monoalkylated aromatic compound, wherein the transalkylation catalyst comprises a mixture of at least:

(i) a first crystalline molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom; and

(ii) a second crystalline molecular sieve different from the first molecular sieve and selected from zeolite beta, zeolite Y and mordenite [two different crystalline molecular sieves, wherein each of said molecular sieves is selected from zeolite beta, zeolite Y, and mordenite and a material having an X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom].

2.(Amended) The process of claim 1, wherein the transalkylation catalyst comprises a mixture of at least:

(i) a first crystalline molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom; and

(ii) a second crystalline molecular sieve different from the first molecular sieve and selected from zeolite beta[, zeolite Y] and mordenite.

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10.(Amended) A process for producing a monoalkylated aromatic compound comprising the steps of:

- (a) contacting an alkylatable aromatic compound with an alkylating agent in the presence of an alkylation catalyst to provide a product comprising said monoalkylated aromatic compound and a polyalkylated aromatic compound, and then
- (b) contacting the polyalkylated aromatic compound from step (a) with said alkylatable aromatic compound under at least partial liquid phase conditions and in the presence of a transalkylation catalyst to produce a monoalkylated aromatic compound, wherein the transalkylation catalyst comprises a mixture of at least:

- (i) a first crystalline molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom; and

- (ii) a second crystalline molecular sieve different from the first molecular sieve and selected from zeolite beta, zeolite Y and mordenite [two different crystalline molecular sieves, wherein each of said molecular sieves is selected from zeolite beta, zeolite Y, mordenite and a material having an X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom].

15. (Amended) The process of claim 10, wherein the transalkylation catalyst comprises a mixture of at least:

- (i) a first crystalline molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom; and
- (ii) a second crystalline molecular sieve different from the first molecular sieve and selected from zeolite beta, [zeolite Y] and mordenite.

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19. (Amended) A process for producing cumene comprising the steps of:

- (a) contacting benzene with propylene under at least partial liquid phase conditions and in presence of an alkylation catalyst to provide a product comprising cumene and polyisopropylbenzenes, and then
- (b) contacting the polyisopropylbenzenes from step (a) with benzene under at least partial liquid phase conditions and in the presence of a transalkylation catalyst to produce further cumene, wherein the transalkylation catalyst comprises a mixture of at least:
 - (i) a first crystalline molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom; and
 - (ii) a second crystalline molecular sieve different from the first molecular sieve and selected from zeolite beta, zeolite Y and mordenite

[two different crystalline molecular sieves, wherein each of said molecular sieves is selected from zeolite beta, zeolite Y, mordenite and a material having an X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom].